Centre for
Resource Studies

Queen's University
Kingston, Ontario

Annual Report for the Period 1 May 1985 — 30 April 1986

Centre for Resource Studies

Origins and Objectives

The Centre is a cooperative research institute established at Queen's University in 1973. Funded by The Mining Association of Canada and the federal Department of Energy, Mines and Resources, and co-sponsored by Queen's University, its function is to improve understanding of the complex questions underlying issues of mineral resource policy (excluding oil and gas). The purposes of the Centre are accomplished through a program of research and publication, and by providing opportunities for liaison between representatives of federal and provincial governments, the industry, labour, universities and other interested groups.

Summary of Activities 1975-86

In 1975, a multi-disciplinary research program was launched on the national impact of mining, to study the effects of the mining industry on the economy and on other aspects of Canadian society. This program was completed in 1978. Late in 1976 a second major research thrust was undertaken, with the objective of examining the mineral-related policies and programs of the federal and provincial jurisdictions in Canada. Studies arising from both programs have been published as monographs and working papers, the first appearing in 1976. As of April 1986, seventeen monographs and thirty-five working papers have been published on these and other topics. In 1981 a new series of publications entitled Technical Papers was introduced, and six in this series have been published so far. In addition, twenty-four issues of CRS Perspectives have been distributed to our mailing list which now has approximately 4,500 names.

Over the current year, CRS staff and associates began five new projects and continued work in other areas. Outside researchers initiated six new studies and continued with four from previous years.

In 1977 the Centre held the first of a series of CRS Policy Discussion Seminars. Each seminar brings together, in a constructive working environment, invited representatives of a diversity of interests to discuss a topic of current policy concern. Each gives rise to a set of proceedings which contains the text of papers presented at the seminar, as well as a digest of discussions. Sixteen seminars have been held up to April 1986.

The Centre has continued its activities in contract research, carrying out projects for the federal and provincial governments. Under a contract with the Ministry of State for Science and Technology, CRS completed a study on the development and application of new technologies in the mining industry. The B.C. government commissioned the Centre to update the study completed in March 1985 for the Nova Scotia government which compared the locational aspects of mine development economics in various parts of Canada. The Canadian International Development Agency has asked CRS to prepare a directory of information on the professional workforce in the Canadian mineral industry sector, as background information for CIDA's mineral-related activities.

Further details of CRS activities may be found in later sections of this report. The Executive Director and Board of Directors wish to acknowledge the contribution of CRS staff, associates, and committee members. Without their strenuous efforts and generous allocation of time, the accomplishments of the past year would not have been possible.

1985-86 Activities of the Centre

The major focus for the Centre's research and activities continued to be productivity and international competitiveness. The long-term research interests of the Centre included Dr. Mackenzie's ongoing work on his data base of Canadian mineral deposits. He has added gold deposits and extended the base metal coverage. David Yudelman continued his examination of the policy process and began work on a comparative study of business/government relations in Australia, South Africa, and Canada. Margot Wojciechowski continued her update of current program and policy initiatives resulting from the mineral policy process.

Several medium- and short-term research projects are progressing in response to economic and policy forces. David Anderson continued his Pacific Rim coal studies and began a new project in association with the C.D. Howe Institute on the future prospects for the Canadian mining industry. Work continues on studies of demand and supply issues in Korea and the Soviet Union and on the economic contribution of mine infrastructure to development in Australia. A study funded by the Ministry of State for Science and Technology examined current developments in exploration, mining, processing, and metallurgy and assessed opportunities for improving industry productivity through technological development. On the subject of geological aspects of mining productivity, CRS released a publication by Brian Mackenzie in its technical paper series. Two CRS policy discussion seminars were held during 1985-86 and both focused on international competitiveness. In November 1985, CRS hosted a discussion seminar entitled "Structural Change in the World Mineral Industry", while the April 1986 seminar topic was "Technology Policies in the Mineral Industry".

Other short-term responses to current issues include two newly initiated projects on taxation: Brenda Dyack's study of the implications of a value-added tax for the mining industry and Basil Kalymon's analysis of flow-through share financing. On the timely issue of trade with the United States, David Haglund will examine American protectionist pressure in copper, potash, and uranium.

To facilitate research at CRS, two Zenith computers were purchased during 1985-86. These computers have enabled the Centre to establish its own in-house data base of Canadian mining statistics and have helped in accessing and processing information and in the production of manuscripts.

CRS is scheduled to move from its present quarters at 100 Barrie Street to a new building on Queen's campus in September 1987. The building will house a new Institute for Policy Studies as well as five other policy-oriented institutes and schools. David Anderson, Executive Director of CRS, was appointed by the Principal of Queen's to chair a committee charged with planning the structure and activities of the proposed Institute for Policy Studies.

1985-86 marked the first year of Keith Buck's appointment as Distinguished Visitor to CRS. As well as working on his project on international consultative organizations and presenting a paper at the CRS Policy Discussion Seminar on Structural Change in the World Mineral Industry, Mr. Buck travelled extensively throughout Canada as a distinguished lecturer for the Canadian Institute of Mining and Metallurgy.

In addition to its program of formal research, seminars, and publications, CRS also provides ongoing advice and commentary through its newsletter, CRS Perspectives, presentations, and the media.

Research and Publications

Research Completed since May 1985

The Politics of Environmental Regulation: The Case of Acid Rain in Ontario, Edwin Black and Gail Wood, Department of Political Studies, Queen's University. This study looked at the regulation of sulphur dioxide emissions by the Government of Ontario. It provides background information on the phenomenon of "acid rain", of attitudes toward its regulation, and of the present extent of its regulation, along with an explanation of Ontario's policy situation and the limits of change. The manuscript will not be produced as a CRS publication, but copies of the thesis are available through Queen's Department of Political Studies.

Mineral Policy Update 1984, Margot Wojciechowski and Mary Louise McAllister, Centre for Resource Studies. The fourth in this annual series, the study documents the mineral policy and program changes made during 1984 by the federal government, the territories, and the provinces. It was published in September 1985.

The MacDonald Royal Commission and the Mining Industry, David Yudelman, Centre for Resource Studies. This study examines the mining industry's responses and representations to the Macdonald Royal Commission on the economy, and in the process provides a perspective on the Canadian mining industry in the 1980s from the vantage point of the producers. It was published in September 1985.

Canadian Interests and U.S. Mineral Policy, David Haglund, Department of Political Studies, Queen's University. This study, initiated through a grant-in-aid of research, identifies policies that the United States has been considering, or might consider, for the purposes of reducing U.S. vulnerability to mineral supply disruptions, and examines the degree to which such policies do or might affect Canadian mineral interests. This research has enabled Dr. Haglund to publish four articles in policy journals, and make presentations to the CRS Advisory Council at their 1985 meeting and to the CRS Policy Discussion Seminar on structural change in the mineral industry. He has also written a two-part article for CRS Perspectives which is based on work done under this grant-in-aid.

Eldorado and Public Policy, Maureen Matthews, independent researcher. This study is a reworking of the author's masters thesis prepared for the School of Public Administration at Carleton University on the public accountability of Eldorado Nuclear Limited. For CRS purposes, Ms. Matthews focused on the role of the Crown-owned company as an instrument of public policy, and the related issues of public accountability and commercial competitiveness. The study will not be published by CRS.

Effects of Location on Mineral Development Potential: Nova Scotia's Competitive Position in Canada, Dallas W. Davis, Brian W. Mackenzie, Michel L. Bilodeau, Centre for Resource Studies. This project, initially funded by the Nova Scotia Department of Mines and Energy, under sponsorship of the Canada-Nova Scotia mineral development agreement, examines regional economic differences and variations in taxation policies which influence the economics of mining. For this purpose, two hypothetical mine development opportunities - a medium-size open pit tungsten deposit and a small underground gold deposit - are evaluated initially in Nova Scotia, and then in a number of other mining regions and provinces. Results are analyzed with respect to the effects of location. The final report, completed in May 1985, has been made available on open file by the Nova Scotia Department of Mines and Energy. A summary paper, presented at the annual meeting of the Mining Society of Nova Scotia in June, has been submitted to the CIM Bulletin for publication. In addition, CRS has published a working paper based on the results of this study.

An Analysis of Japanese Metallurgical Coal Sourcing Policies: The Canadian and Australian Experience, David Anderson, Centre for Resource Studies. This study assesses the impact of the coordinated purchasing policies of the Japanese steel mills on metallurgical coal producers in Canada and Australia. Special attention is given to describing and evaluating the Australian re-

sponse to this issue. The manuscript is now under review and three papers based on this study have been accepted for publication by journals.

Prospects for Secondary Processing of Gypsum in Nova Scotia, Jim Brown, Department of Mining Engineering, and Roger Wright, School of Business, Queen's University. The Government of Nova Scotia, under sponsorship of the Canada-Nova Scotia mineral development agreement, commissioned CRS to investigate the potential for secondary processing of Nova Scotia gypsum in that province. The final report provided the Department of Mines and Energy with documentation on the technological and infrastructural costs associated with processing, together with information on the historical and current market environment.

Opportunities for Technological Innovation in the Canadian Mineral Industry, Margot Wojciechowski, Centre for Resource Studies, and Peter Richardson, School of Business, Queen's University. Commissioned by the Ministry of State for Science and Technology (MOSST), and also supported by Energy, Mines and Resources Canada (EMR), this study provides background information on the Canadian mineral industry, an overview of the current state of technology in all aspects of the industry, from exploration to physical metallurgy, and on technologies of special interest to MOSST. It identifies opportunities for innovation in the industry, and makes recommendations aimed at taking advantage of the available opportunities through government and industry initiatives. The study is a working document, and is available from MOSST.

Locational Aspects of Mine Development Economics: Effects of the 1985 British Columbia Budget, Brian W. Mackenzie, Centre for Resource Studies. Funded by the B.C. Ministry of Energy, Mines and Petroleum Resources, this report updates the study prepared for the Nova Scotia Government under the sponsorship of the Canada-Nova Scotia mineral development agreement (completed in March 1985). Two hypothetical mine development opportunities are evaluated in a number of mining regions and provinces. Results are analyzed with respect to location. This report was submitted in February 1986.

Research in Progress

Foreign Direct Investment by the Canadian Nonferrous Metal Industry, Elizabeth Urquhart, Independent Researcher. This is a systematic study of direct investments made abroad by Canadian nonferrous mining companies. It will include both stocks and flows of all foreign direct investments related to mining, such as exploration, mining, refining, processing and marketing, as well as investments in other sectors such as manufacturing.

Size and Grade Characteristics of Base Metal Deposits in Canada, Duc Le, former graduate student, Department of Geological Sciences, Queen's University and Brian Mackenzie, Centre for Resource Studies. This study examines the tonnage and gross in-situ value per tonne characteristics of base metal deposits, utilizing data for 275 deposits discovered in Canada to 1977. The actual distributions of these endowment characteristics, their relationship to the lognormal statistical model, and the relationship between deposit size and grade are analyzed for various types of base metal deposit. Illustrations are provided of how the results can be applied to government policy and corporate planning issues. A summary paper was presented at the CIM annual meeting in April 1984. The study is being prepared for publication as a technical paper.

Competitive Position of Canadian Minerals in International Markets, Brian Mackenzie and David Green, Centre for Resource Studies. Changes in the international position of Canada's mineral industry are linked to changes in the general rate of inflation and in the exchange rates between producing and consuming nations. The study examines competitive trends for Canada's eight leading mineral exports relative to the major producing and consuming nations during the 1963-82 period. The data base is being updated to 1984 and placed on micro-computer spreadsheets to facilitate evaluation, analysis, and presentation of results.

Economic Comparison of Mineral Supply Potential in Northern and Southern Canada, Leo Verleun and Brian Mackenzie, Centre for Resource Studies. This study compares endowment and locational characteristics of exploration and mining in the northern territories with those of the more-accessible southern provinces. The first stage of the study was completed under contract to Indian Affairs and Northern Development Canada in March 1984. A more thorough analysis was subsequently carried out in Leo Verleun's masters thesis, completed in late 1984. This work has been further extended and a manuscript is currently being prepared for publication.

Management in the Mineral Industries, Peter Richardson, School of Business, Queen's University. This study will look at the applicability of modern management concepts and practices to management in the resource industries. This background research may lead to a CRS seminar or a more detailed research project.

Mineral Policy Update 1985, Margot Wojciechowski, Centre for Resource Studies. The fifth in this annual series, this study will document the mineral policy and program changes made during 1985 by the federal government, the territories, and the provinces.

Economic Comparisons of Base Metal Exploration in Australia and Canada, Brian Mackenzie, Centre for Resource Studies, and Roy Woodall, Western Mining Corporation. This study compares the economics of base metal exploration in Australia during the period 1955-78 with similar assessments made in Canada for the 1946-77 period. The comparison is based on documented historical experience, evaluated in the context of current economic outlook conditions. Mineral exploration economics is measured by the relationship between real exploration expenditures, and the value of economic deposits discovered as the result of that exploration. A paper focusing on the productivity aspect of the topic was presented at a meeting on the economics of mineral exploration, convened by the International Institute for Applied Systems Analysis, Laxenburg, Austria, in December 1983. The results are being updated and the analysis extended in a manuscript being prepared for CRS publication.

The Contribution of Mine Infrastructure to Economic Development in North Australia, Ciaran O'Faircheallaigh, Australian National University. The objective of this research is to establish the extent to which infrastructure developed to permit mining in North Australia has contributed to more broadly-based economic growth. This study has potential policy implications for remote regions in Canada.

Quantitative Assessment of the Economic Impact of Mining on the Canadian Economy, David L. Anderson, Centre for Resource Studies. This study draws on existing data sources (primarily computer data bases) to demonstrate the impact of mining on Canada's economy, especially in comparison with other resource industries such as forestry and petroleum.

International Mineral Consultative Organizations, W. Keith Buck, Centre for Resource Studies. As the Centre's Distinguished Visitor, Mr. Buck has begun a study of international consultative arrangements vis-a-vis their applicability to the Canadian mining industry. He will draw on his background as Secretary General of the Lead Zinc Study Group and his participation in other international consultative organizations.

Exploration of the Korean Market for Canadian Minerals, Yul Kwon, University of Regina. In this study, Dr. Kwon will investigate the trade opportunities available to Canada in the rapidly expanding industrial economy of South Korea. With the prospect of static markets for Canadian minerals in the USA, EEC, and Japan, Canada must investigate new trade opportunities. It is expected that South Korea, whose economy has grown at a rate of 8 percent per annum over the last 20 years, will be the "Japan" of the future.

The USSR's Mineral Policy and its Implications for Canada, Miron Rezun, Queen's University. This study will examine the extent to which Canadian mineral interests are, or could be, affected either negatively or positively by Soviet mineral policy. Secondly, it will outline plans, policies, or proposals the USSR has

been, or might be, considering in a possible "resource war" that could affect Canada.

Business-Government Relations in Mining, David Yudelman, Centre for Resource Studies. This study will be a review of the literature on the relationship between business and government, with a primary focus on mining.

Alternative Models for Industry-Government Relationships in Mining, David Yudelman, Centre for Resource Studies. This study will examine the relationship of government and the mining industry in Australia and South Africa. Special reference will be made to the relevance (if any) for Canada of the Australian and South African models.

Australian and Canadian Export Coal: A Policy Analysis of Relative Competitiveness, David Anderson, Centre for Resource Studies; and Donald W. Barnett, Macquarie University, Australia. The objective of this study is to assess the relative competitiveness of Australian and Canadian export coals in the Pacific Rim market. The analysis focuses on the domestic cost structure of each industry with special attention given to operating costs, non-profit and profit-based taxes, domestic transportation levies, and infrastructure financing arrangements.

Economic Analysis of Canadian Gold Supply, Michael Doggett and Brian Mackenzie, Centre for Resource Studies. A comprehensive mineral deposit data base is being assembled, documenting short-, medium-, and long-term aspects of Canadian gold supply, concentrating on trends during the 1946-84 period. This information is being organized on microcomputer spreadsheets for evaluation and analysis. It is expected that this work will be integrated with the economic evaluation procedures and base metal data base which has been under development at CRS since 1975. Papers on long-term exploration aspects of the topic were presented at the short course on Gold Exploration 1985, held at Queen's University in May, and at the CIM Symposium on Gold in the Western Shield, held in Saskatoon in September 1985.

Economics of Gold Exploration and Mine Development in Quebec, Michel Bilodeau, McGill University. This study focuses on the compilation of a comprehensive data base on significant gold deposits located in Quebec. It is an extension of the base metal data base compiled by the researcher and B.W. Mackenzie of CRS. In the first phase of the study, actual data will be compiled on a deposit-by-deposit basis assuming present-day economic and technological conditions. The second phase consists of refining and adapting the generalized costing relationships in the economic evaluation model which is used in conjunction with the base metal deposit data. The third phase consists of the preliminary analysis of the data base, given current gold price forecasts. Finally, the economics of gold exploration in Quebec will be examined by combining this information with the total gold exploration expenditures compiled for the same time period.

The Value-Added Tax Option: Implications for the Canadian Mining Industry, Brenda Joan Dyack, Consulting Economist. This study has two purposes: to describe a value-added tax and to investigate how this tax would affect the Canadian mining industry. The various types of value-added taxes and their problems of implementation will be reviewed, with emphasis given to areas of importance to the mining industry. Where data are made available by the industry, numerical examples will illustrate the impact of the tax on a representative mining firm.

The Challenge to Canadian Mineral Exports to the USA: A Comparative Assessment of Protectionist Pressure in Copper, Potash and Uranium, David G. Haglund, Centre for International Relations, Queen's University. This study will explore the extent to which Canadian export interests in three commodities - copper, potash, and uranium - are or may be affected by the apparent increase in U.S. Congressional sentiment for protectionism. The author began to examine the protectionist challenge as part of a broader research project on "Canadian Interests and U.S. Mineral Policy" with the assistance of a CRS grant-in-aid in 1984. The proposed research will develop further some of the issues examined in the earlier study and extend the scope of the inquiry to include copper and potash.

Flow-through Share Financing, Basil A. Kalymon, Faculty of Management Studies, University of Toronto. This project will update previous studies with regard to the level of activity in flow-through financing. It will document the alternative mechanisms available and analyze the investment incentives created by flow-through shares. The researcher will draw conclusions as to the future potential and limitations of flow-through financing.

Analysis of the Canadian Mineral Economy, David Anderson and Brian Mackenzie, Centre for Resource Studies. This study, addressed primarily to an international audience, will examine the broader issues of Canada's mineral economy. It will provide a brief historical review of these issues and explain the key factors which impinge on the international competitiveness of Canadian mining. Through the use of computer simulation techniques, this study will illustrate the impact of taxation, transportation, productivity, and exchange rates on the financial health of the industry.

Productivity in the Canadian Mineral Industry, Frank Anton, University of Calgary. This researcher has been awarded a grant-in-aid of research to revise and update a study of "Productivity in the Canadian Mineral Industry" undertaken for Energy, Mines and Resources Canada in 1973-74. Two productivity models will be compared and analyzed, and the policy implications for government and industry will be considered. Innovation techniques for improving productivity will be presented in detail to serve as a guide for labour and management.

The Impact of State-Owned or State-Assisted Mines and Smelters on International Markets, Ciaran O'Fairchellaigh, Australian National University. This study will examine the implications for producers in "free market" situations (i.e. in Canada and Australia) of competing with producers whose input costs and/or output levels are influenced by noncommercial criteria. The researcher will concentrate mainly on copper, iron ore, and aluminum. He will visit CRS for three months in 1986 to collect data and conduct interviews on the Canadian situation.

The Changing Transportation Environment of the Canadian Mineral Industry, Iain Wallace, Carleton University. This study will investigate and analyze critical issues in Canadian mineral transportation. Relevant data and documentary material will be gathered from shippers, carriers, government and industry spokesmen, and relevant agencies. Where appropriate, the study will quantify and project trends.

Future Prospects for the Canadian Mineral Industry, David Anderson, Centre for Resource Studies. This study, undertaken in association with the C.D. Howe Institute, explores the "sunset industry" thesis as it applies to mining. It will look at the relevance of this designation, focusing on the international competitiveness of three mineral commodities: gold, uranium and coal. Underlying issues such as productivity, technological change, market access, exchange rates, and ore grades will be discussed.

Mining Sector Directory, Margot Wojciechowski and Kelly Strueby, Centre for Resource Studies. The Canadian International Development Agency has commissioned CRS to prepare a directory of information on the professional workforce in the Canadian mineral sector as background information for CIDA's mineral-related activities. The directory will be in the form of a computer data base and will provide workforce information on operating companies, consultant and professional services and institutions.

New Publications

The following new publications arising from the CRS research and seminar programs were released during 1985-86.

Mineral Policy Update 1984, by Margot Wojciechowski and Mary Louise McAllister, was published in August 1985. This report presents a catalogue of annual mineral policy and program changes and highlights in Canada. Innovations and policy changes, rather than ongoing programs, are emphasized and areas of concern are identified. Jurisdictions covered include the federal government, the territories, and all provinces.

Canadian Mineral Policy Past and Present: The Ambiguous Legacy, by David Yudelman, was published in September 1985. This study looks at the formulation of federal mineral policy in Canada in recent years, and examines the industry-government relationships involved in its formulation.

Mining and the Macdonald Commission: The State of the Industry in the Mid-1980s, by David Yudelman, was published in September 1985. It examines the mining industry's responses and representations to the Macdonald Royal Commission on the economy, and provides a perspective on the Canadian mining industry in the 1980s from the vantage point of the producers.

Mineral Technology Transfer: Evaluation of the CANMET Pit Slope Project, by Brian Mackenzie and Rimas Pakalnis, was published in June 1985. This study assesses quantitatively the costs, benefits and technical merit of the CANMET pit slope project. The CANMET pit slope project was initiated in 1972 to help transfer improvements in slope design procedures to mining industry practice. The pit slope project experience should help establish guidelines for planning future government-industry research initiatives.

Geological Aspects of Mining Productivity: Canada's Base Metal Resources, by Brian Mackenzie, was published in November 1985. This paper examines the geological aspects of mining productivity or, in other words, the effect of the mineral resource input on productivity change in the mining sector. The relationship between real exploration expenditures and the value of economic deposits discovered as the result of that investment is appraised.

Sourcebook for Native Participation in Canadian Mineral Activities, by Margot Wojciechowski, was published in June 1985. Production of this publication was supported by Energy, Mines and Resources and Indian Affairs and Northern Development. It is intended for native people who may wish to become involved in employment or entrepreneurial activities related to the mineral industry.

Canadian Mineral Taxation, edited by Margot Wojciechowski, was published in November 1985. This publication contains the proceedings of the 14th CRS Policy Discussion Seminar. The invited papers discuss the impact of past tax changes on the mineral industry, examine the present situations, and present proposals for future changes.

Effects of Location on the Competitive Position of Mineral Exploration and Development in Canada, by B.W. Mackenzie, D.W. Davis, and M.L. Bilodeau, was published in April 1986. This publication is an extension of a CRS study commissioned by the Government of Nova Scotia under sponsorship of the Canadian-Nova Scotia mineral development agreement. It examines regional economic differences and variations in taxation policies which influence the economics of mining.

A complete list of CRS publications appears at the end of this report.

Publications Outside CRS by CRS Researchers

David Anderson, "Market Power and the Saskatchewan Potash Industry", *Canadian Public Policy*, XI (Supplement): 321-328, July 1985.

David Anderson, "Inter-provincial Competition and the Canadian Potash Industry", *CIM Bulletin*, 78(880): 33-38, August 1985.

David Anderson, "Japanese Coking Coal Procurement Policies: Some Implications for Canadian Producers", *Northern Miner Magazine*, 1(2), March 1986.

Brian Mackenzie, *Effects of Location on Mine Development Potential: Nova Scotia's Competitive Position in Canada*, with D.W. Davis and M.L. Bilodeau, open file report 621, Nova Scotia Department of Mines and Energy, Halifax, 104 pp., May 1985.

Brian Mackenzie, review of "Mineral Resource Appraisal" by DeVerle P. Harris, *Episodes*, vol. 8, no. 2, June 1985.

Brian Mackenzie, "Economic Aspects of Mineral Resource Assessment", background paper presented for workshop Prospects for Mineral Resource Assessment, Geological Survey of Canada and United States Geological Survey, Leesburg, Virginia, 15 pp., September 1985.

Brian Mackenzie, "Economics of Mineral Exploration in Australia", with M.L. Bilodeau, summary article, *Materials and Society*, no. 4, pp. 479-487, December 1985.

Brian Mackenzie, "Locational aspects of mine development economics: Nova Scotia's competitive position in Canada" with D.W. Davis and M.L. Bilodeau, *CIM Bulletin*, volume 79, no. 888, April 1986.

Margot Wojciechowski, "Canada's Convoluted Mining Tax", *Northern Miner Magazine*, January 1986.

Margot Wojciechowski, "Bring Back the Engineer", *Northern Miner Magazine*, February 1986.

David Yudelman, "New Directions for Canadian Mining: An interview with George Miller", *Canadian Mining Journal*, August 1985.

David Yudelman, "The Practice of Consensus", *Policy Options*, vol. 6, no. 8, October 1985.

David Yudelman, "Managing Maturity: A New Mineral Policy for Canada", *Resources Policy*, March 1986.

David Yudelman, "Mining and the Macdonald Commission", *Canadian Mining Journal*, November 1985.

David Yudelman, "The Macdonald Report: Expensive Consensus", *Whig Standard*, Tuesday, October 29, 1985.

Presentations Made by CRS Researchers and Associates

(Based on CRS-related work)

Brian Mackenzie:

Principal lecturer, professional development seminar on "Mineral Project Evaluation Techniques and Applications", McGill University, February 13-15, 1985.

"Economic Guidelines for Exploration Planning", one-week seminar for State Mining Property Commission, Sunne, Sweden, April 12-20, 1985.

"Economic Guidelines for Gold Exploration", a paper presented at Gold Exploration 1985, Queen's University, May 14, 1985.

"Decision-Making Methods and the Mineral Industry", two-week seminar for Australian Mineral Foundation, Adelaide, May 27 - June 7, 1985.

"The Economic Interface Between Mineral Exploration and Resources Development and Planning", two-day seminar for The Broken Hill Proprietory Company, Melbourne, June 19-20, 1985.

"Effects of Location on Mine Development Potential: Nova Scotia's Competitive Position in Canada", with D.W. Davis and M.L. Bilodeau, paper presented at Annual Meeting of The Mining Society of Nova Scotia, Ingonish, Nova Scotia, 27 pp. (Bilodeau presenting), June, 1986.

"Economic Guidelines for Gold Exploration", paper presented at *Gold in the Western Shield,* CIM Symposium, Saskatoon, September 9, 1985.

"Prospects for Mineral Resource Assessment", discussion group leader at work shop, Geological Survey of Canada and United States Geological Survey, Leesburg, Virginia, September 24-27, 1985.

Mineral Economics Course, principal lecturer, Newfoundland Public Service Commission, St. John's, Newfoundland, November 13-15, November 21-22, 1985.

"Economic Guidelines for Gold Exploration", paper presented at 13th Annual Geoscience Forum, Yellowknife, December 4, 1985.

"Economic Guidelines for Exploration Planning", one-week seminar at Queen's University, December 9-13, 1985.

David Yudelman:

"Canadian Mineral Policy Formulation", paper presented at Learned Societies Meeting, Montreal, May 29-31, 1985.

"Closing of the Frontier: Labour Migrancy to the Rand Gold Fields 1920-1985", paper presented at Mining History Conference, University of Melbourne, Australia.

"South African Mining Industry", paper presented to Queen's Department of Political Studies, November 1, 1985.

"Mine Labour in South Africa", paper presented at the African Studies Association Conference in New Orleans, November 23, 1985.

Peter Richardson:

"Technical Challenges facing the Canadian Mineral Industry", paper presented at CIM AGM in Vancouver, April 21-25, 1985.

CRS Policy Discussion Seminars

The CRS Policy Discussion Seminars are designed to bring together senior individuals from federal and provincial governments, corporations, universities, trade unions, and other interested groups to discuss current mineral policy issues. The informal atmosphere is conducive to the free and constructive exchange of views. In a typical two-day session, six or eight speakers present background information and views on the issue. Subsequent discussion in small groups and open sessions allows the participants to develop a mutual understanding of the problem and of other viewpoints, and to discuss potential solutions. The proceedings are published, including the papers and some analysis and conclusions.

Structural Changes in the World Mineral Industry

In September 1985, a policy discussion seminar was held on the subject of "Structural Changes in the World Mineral Industry". Papers and discussions dealt with changing patterns of supply and demand, the general economic outlook for mining, trade policy, and currency fluctuations, and various strategies for adapting to these structural changes. The following papers were presented:

Structural Changes in the World Mineral Industry, P. Crowson, Rio Tinto Zinc;
Remarks, B. Deeks, Noranda Sales;
Structural Changes in the World Mineral Industry: Changing Demand Patterns, G. Jewett, Jewett & Associates;
The Canadian Mineral Industry: Facing Structural Change, G. Peeling and W. Chambers, Mineral Policy Sector, Energy, Mines and Resources Canada;
Future Supplies of Metals: The Transition, S. Hunt and G. Haclin, Brook Hunt;
Structural Changes in the Canadian Zinc Market, J. Davies, Noranda Sales;
The World Potash Industry - Changes in Supply and Demand, D. Karvonen, Potash Corporation of Saskatchewan;
The Future Economic Environment for Minerals, J. Lydall, First Marathon Securities Limited;
The Impact of Currency Fluctuations on Mineral Markets Trade, C. Carson, Cominco Limited;
The Impact of Trade Policies on Canadian Minerals, G. Denis, External Affairs Canada;
Does Freer Trade Matter for the Canadian Mining Industry, D. Daly, York University;
Protectionism and the National Security Argument: The Case of Canadian Uranium Exports to the U.S., D. Haglund, Queen's University;
Trade Policies, R. Harris, Queen's University;
Strategic Responses to Structural Change: A Federal Government Perspective, I. Bennett, Finance Canada;
Quebec's Strategic Response to Structural Changes in the Mineral Industry, G. Mahoney, Ministry of Energy and Resources, Provice of Quebec;
Concluding Overview: Meeting the Future Challenge, W.K. Buck, Centre for Resource Studies.

Technology Policies in the Mineral Industry

In April 1986, a policy discussion seminar was held on the subject of "Technology Policy in the Mineral Industries." The purpose of the seminar was to explore the issues relevant to this key aspect of mineral policy in Canada. The nature of the technical challenge and the task facing the mineral industries was detailed in the presentations and discussion. In addition, several papers proposed policy initiatives which might lead to more effective technical strategies within the mineral industries, as well as supporting roles for other Canadian institutions. The following papers were presented:

The Technical Challenge Facing the Canadian Mineral Industry, R. Woodbridge, Canadian Advanced Technology Association;

Opportunities for Technological Innovation in the Mineral Industry, M. Wojciechowski, Centre for Resource Studies;
The Role of R&D in Canadian Mining Companies, F. Pickard, Falconbridge Limited;
Barriers to Innovation within the Mining Industry, D.M. Bevelander, Bevelander and Company;
Future Directions for CANMET: A View from the Steel Industry, J. Hood, Stelco Limited;
Future Directions for CANMET: the CANMET View, W.G. Jeffery and J. Kuryllowicz, CANMET;
Cooperation between CANMET and Industry, P. Richardson, Queen's University;
Cooperation in the Nickel Industry, H. Schade, Nickel Development Institute;
The Role of Other Institutions in New Technology, M. Sayer, Queen's University, G. Hatch, Hatch Associated Limited, D.W. Hutchison, Continuous Mining Systems Limited, and A. Molinari, Outokumpu Equipment Canada Limited.

CRS Perspectives

Three issues of CRS Perspectives were published during the current year. Perspectives is an occasional bulletin edited by David Yudelman that contains comment about the Canadian mineral industry, reviews, and news of CRS activities and publications. Perspectives is sent to the entire CRS mailing list of about 4,500 individuals and institutions interested in mineral policy issues.

Various aspects of mineral policy were discussed in the three issues of Perspectives issued in 1985-86. The August 1985 issue featured articles entitled "Metal prices cyclical or structural?" (Edward M. Yates, Cominco Limited), "Mining and the Macdonald Commission" (David Yudelman, Centre for Resource Studies), and "Resource Exports and Economic Growth" (Otto Fisher, formerly of Energy, Mines and Resources Canada). In the November 1985 issue, David Haglund of the Centre for International Relations of Queen's University presented Part 1 of a two-part article on "The Protectionist Threat to Canadian Uranium" Also featured was a piece by Donald Daly of York University, "Comparative advantage and Canadian mining" and another contribution from David Yudelman entitled "Mineral policy's ambiguous legacy". CRS Perspectives for April 1986 contained the second part of David Haglund's article, and an additional piece entitled Australian and Canadian Coal Exports (Don Barnett, MacQuarie University).

Financial Arrangements

The Centre disbursed $137,447 on administrative activities and $409,859 on research activities during the year.

Continuing financial support is received from The Mining Association of Canada and Energy, Mines and Resources Canada. Funding from The Mining Association of Canada was increased from its 1984-85 level of $187,500 per year ($75,000 for administration and $112,500 for research) to $196,000 per year ($78,400 for administration and $117,600 for research). This funding was matched by Energy, Mines and Resources Canada. A total of $41,779 was recovered from the sale of publications and seminar registration fees.

The Centre also seeks to serve the research needs of other agencies. In the current year, research support was received in the amount of $73,618 from agencies other than the Centre's permanent sponsors.

The Board of Directors

The Board consists of sixteen members. The Executive Director and the Advisory Council Chairman are ex-officio members. Of the remainder, four are appointed by The Mining Association of Canada, three by Energy, Mines and Resources Canada, and seven by the Principal of Queen's University. The Chairman is C. George Miller, Managing Director, The Mining Association of Canada. The chairman of the Research Advisory Committee has observer status at Board meetings.

The Board met twice during the year; the spring meeting was held May 1 in Kingston and the fall meeting took place October 30 in Ottawa. On these occasions, the Board discussed a number of ongoing and potential research themes, the recommendations of the Advisory Council, and various administrative and policy matters.

Members of the Board who retired during the year were G.J. Hodge and R.D. Hutchinson. New appointments for 1985-86 were R. Sully (EMR) and E. Black (Queen's). R.J. Uffen, P. Calder (Queen's) and P.C. MacCulloch (MAC) were reappointed.

Members of the 1984-85 Board of Directors were as follows:

D.L. Anderson
Centre for Resource Studies
J. Beausoleil
Department of Finance
E.R. Black
Queen's University
R.W. Boadway
Queen's University
P. Calder
Queen's University
W. Curlook
Inco Limited
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D.G. Sinclair
Queen's University
R.Sully
Energy, Mines and Resources Canada
R.J. Uffen
Queen's University
D.J. Worth (1985 only)
Canadian Imperical Bank of Commerce

The Advisory Council

The Advisory Council currently has a membership of fifty-three. All researchers associated with the work of the Centre are appointed to membership for the duration of the research or a minimum of one year. Other members, representing not only governments, industry, and the professions, but also such interested groups as trade unions, consumers, and native peoples, are appointed for a three-year term. The functions of the Council are to advise the Board, primarily on the research program, and to act as advisors to the Centre's staff.

The Council's annual meeting was held on May 2, under the chairmanship of Don Worth. Reports on the Centre's ongoing activities were received and discussed, along with presentations by a number of CRS and external researchers. Keith O'Brien was chosen as chairman of the Council for 1986.

Advisory Council members for 1984-85 were as follows:

*D.L. Anderson**
Centre for Resource Studies
*P. Andrews**
Energy, Mines and Resources Canada
W.J. Barbour
Noranda Mines Limited
J.C. Beal
Queen's University
J.L. Bonus
retired, the Mining Association of Canada
*K. Brewer**
Energy, Mines and Resources Canada
P. Burnett
Canadian Arctic Resources Committee
P. Caragata
Toronto-Dominion Bank
*C. Carson**
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Mining Consultant
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C.D. Howe Institute
A. Dorr
Dept. of Industry, Commerce and Tourism, Quebec
B.E. Felske
Brian E. Felske and Associates
J.E. Finlay
Northern Development and Mines, Ontario
J.M Fleming
Mines and Energy, Newfoundland
D.M. Fraser
Denison Mines Limited
J. Garnett
Mines and Energy, Nova Scotia
I Haugh
ILAM Associates Limited
D. Hull
Energy, Mines and Resources Canada
D. Hume
Nuinsco Resources Limited
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Canadian Institute of Resources Law
C. Isaacs
The Pollution Probe Foundation
G.A. Jewett
Jewett and Associates
C. Kang
Manitoba Energy and Mines
*R.J. Keyes**
Energy, Mines and Resources Canada
L. Kilburn
Prospectors and Developers Association
J. Kuryllowicz
Energy, Mines and Resources Canada
J. Lazarovich
Indian Affairs and Northern Development Canada
G. Mahoney
Energy and Resources, Quebec
W. Marsh
Retired, United Mines Workers of America
*R. Mason**
Queen's University
*G.B. McRae**
B.C. Ministry of Energy, Mines and Petroleum Resources

*D.L. Morgan** Placer Development Limited
J.M. Newell
Kidd Creek Mines Limited
*E.K. O'Brien**
Inco Limited
B. Partridge
Cominco Limited
*G. Peeling**
Energy, Mines and Resources Canada
C.W. Pelley
Queen's University
P. Reid
The Ontario Mining Association
R. Reid
Saskatchewan Energy and Mines
*R.E. Simeon**
Queen's University
C.H. Smith
Consultant
W.D. Tieman
Northern Development and Mines, Ontario
*R.M. Woodbridge**
Canadian Advanced Technology Association
*D.J. Worth**
Canadian Imperial Bank of Commerce

* Also a member of CRS Research Advisory Committee

The Research Advisory Committee

The Research Advisory Committee was formed in 1976 to advise the Board of Directors and executive director of CRS on research goals and priorities, and on the selection, formulation and direction of research projects. The committee consists of individuals knowledgeable about the mineral industry and research methods, chosen from industry, government, private consulting, and universities. The committee decides on the allocation of grants-in-aid of research and advises on the award of research contracts. In 1981 the committee members all joined the Advisory Council of CRS as well. Under the chairmanship of Robert J. Keyes, the Committee reviewed grant applications and project proposals submitted to the Centre during 1985-86. For a list of members (marked *), see Advisory Council list above.

Personnel

Members of the Centre staff coordinate the program of external research, carry out studies in-house, edit and produce the Centre's publications, organize seminars and meetings, and provide staff services to the Board and Advisory Council. Other related professional activities include participation in conferences and seminars, speaking engagements and teaching, publication of professional writings, and consultation with other researchers.

During 1985-86, the staff and associates of the Centre were as follows:

Core Staff

David L. Anderson, Executive Director
Donna Beaubien, Publications Officer
Sandra Cantelon, Bookkeeper/Secretary
Brian W. Mackenzie, Senior Research Associate
Linda Noble, Departmental Assistant
Margot Wojciechowski, Assistant Director
David Yudelman, Senior Research Associate

Faculty Associates

Michel Bilodeau, Department of Mining and Metallurgical Engineering, McGill;
Alan Green, Department of Economics, Queen's University
David Haglund, Department of Political Studies, Queen's University
Nancy Olewiler, Department of Economics, Queen's University
Peter Richardson, School of Business, Queen's University

Distinguished Visitor

W. Keith Buck

Part-time Staff

In addition, many others have assisted in the work of the Centre at various times. The contributions of Ruth Beck, Kelly Strueby, and Jane Ramin in particular are gratefully acknowledged.

Complete Listing of CRS Publications

Following is a complete list of all CRS publications. Publications that are out of print (marked *) can be ordered from Micromedia Limited. All other publications can be ordered from:

Centre for Resource Studies
Queen's University
Kingston, Ontario K7L 3N6
(Telephone: 613-545-2553)

Monographs and Collections

Conflict and its Resolution in the Administration of Mineral Resources in Canada, by R.M. Burns; 62 pages, 11 tables, 1976. (M-1, $5.00)

The Impact of the Mining Industries on the Canadian Economy, by R.W. Boadway and J.M. Treddenick; 116 pages, 15 tables, 1977. (M-2, $9.00)

The Transportation Impact of the Canadian Mining Industry, by A.I. Wallace; 154 pages, 17 tables, 1977. (M-3, $9.00)

Human Resources in Canadian Mining: A Preliminary Analysis, by J.A. MacMillan, G.S. Gislason, and S. Lyon; 174 pages, 48 tables, 1977. (M-4, $12.00)

Health and Safety in the Canadian Mining Industry, by G.W. Gibbs and P. Pintus; 248 pages, 58 tables, 1978. (M-5, $12.00)

The Canadian Nonferrous Metals Industry: An Industrial Organization Study, by E. Urquhart; 158 pages, 18 tables, 1978. (M-6, $9.00)

Economic Impacts and Linkages of the Canadian Mining Industry, by P.E. Nickel, et al.; 140 pages, 31 tables, 1978. (M-7, $6.00)

Environmental Impact of Mining in Canada, by E.A. Ripley, et al., 274 pages, 45 tables, 1978, reprinted 1982. (M-8, $15.00)

Effects of Taxation on Base Metal Mining in Canada, by B.W. Mackenzie and M.L. Bilodeau; 188 pages, 29 pages, 29 tables, 1979. (M-9, $9.00)

Gold: The World Industry and Canadian Corporate Strategy, by E. Cousineau and P.R. Richardson, 192 pages, 32 tables, 1980. (M-10, $14.00)

The Impact of Policy Change on Decisions in the Mineral Industry: The Case of Exploration in Manitoba, 1969-77, by B.E. Owen and W.J. Kops; 116 pages, 8 tables, 1980. (M-11, $9.00)

The Role of Mineral Taxation in Industry/Government Conflict: The Case of the Saskatchewan Potash Reserve Tax, by David L. Anderson; 135 pages, 41 tables, 2 illustrations, 1981. (M-12, $9.00)

Profitability in the Canadian Mineral Industry, by Charles H. Pye; 178 pages, 42 tables, 12 illustrations, 1981. (M-13, $14.00)

Foreign Investment Control in the Canadian Mineral Sector: Lessons from the Australian Experience, by David L. Anderson; 180 pages, 22 tables, 1983. (M-14, $15.00)

Financing Canadian Mining in the Eighties: Strategies for Action, edited by David Yudelman; 240 pages, with papers by B. Bradly, A. Dorland, J. Erola, P. Gillin, P. Glenshaw, S. Greenwald, B. Kalymon, P. MacCulloch, B. Mackenzie, K. Murphy, A. Powis, R. Sultan, and D. Yudelman, 1984. (M-15, $15.00)

National Resources and International Bargaining Power: Canada's Mineral Policy Options, by Patrick James Caragata; 190 pages, 1984. (M-16, $20.00)

Canadian Mineral Policy Past and Present: The Ambiguous Legacy, by David Yudelman; 188 pages, 1985. (M-16, $15.00)

Proceedings

No. 1 *Rate-of-Return Taxation of Minerals*, edited by P.R. Richardson and N.D. Olewiler, with papers by B.W. Mackenzie and M.L. Bilodeau, P.M.T. White, N.D. Olewiler, J.T. Cawley, and E.P. Gush; 109 pages, 1978. (P-1, $9.00)

No. 2 *International Competition and the Canadian Mineral Industries*, edited by C.H. Pye and M.J. Wojciechowski, with papers by H.C. Armstrong, H.T. Fargey, C.G. Miller, N.D. Olewiler and P.R. Richardson, D. Perlstein, and K.C. Hendrick; 109 pages, 1978. (P-2, $9.00)

No. 3 *Current Concerns in Mineral Policy*, edited by B.W. Mackenzie and C.E. McMurray, with papers by C.R. Archibald, W.J. Barbour, D.B. Brooks, J.S. Dowsett, J.M. Fleming, and G.A. Jewett; 75 pages, 1978. (P-3, $5.00)

No. 4 *Canada's Mineral Trade: Implications for the Balance of Payments and Economic Development*, edited by M.J. Wojciechowski, with papers by B.W. Wilkinson, D.J. McCulla, J.G. MacKinnon, A.G. Balogh, and W.G. Chambers and J.S. Reid; 113 pages, 1978. (P-4, $9.00)

No. 5 *Employee Relations Initiatives in Canadian Mining*, edited by M.J. Wojciechowski, with papers by W.J. Bennett, F.R. Nogas and J.P. Fulcher, W.F. Clarke, S.B. Jones, T.F. Cawsey and P.R. Richardson, and P. Warrian; 85 pages, 1979. (P-5, $5.00)

No. 6 *Junior Mining in Canada: The Problem of Investment and Securing Fair Returns*, edited by M.J. Wojciechowski, with papers by A.J. Freyman, B.A. Kalymon, J.D. Mason, D.W. Scrim, E.H. Neave and P.R. Richardson, and E.G. Thompson; 101 pages, 1979. (P-6, $9.00)

No. 7 *The Future for Junior Mining in Canada, edited by M.J. Wojciechowski*, with papers by Hon. J.A.C. Auld, J.L.C. Lyndon, N.B. Keevil Jr., D.G.C. Menzel, H.T. Fargey, A.J. Freyman, Hon. R. Hnatyshyn, J.C. Baillie, D.W. Scrim, J.P. Bunting, E.H. Neave and P.R. Richardson, L.A. English, M. St.-B. Harrison, R.H. Grasley, and Hon. F. Drea; 125 pages, 1979. (P-7, $12.00)

No. 8 *Mining-Linked Diversification of the Sudbury Basin Economy*, edited by M.J. Wojciechowski, with papers by D.C. Frith, J.P. Reny, A.I. Wallace, J.H. Holtby and L.C. Kitchener, 53 pages, 1980. (P-8, $5.00)

*No. 9 *The Changing Structure of the Canadian Mineral Industry*, edited by M.J. Wojciechowski, with papers by I.A. Stewart, R.F. Mikesell, R. Simeon, R. Keyes and J.M. MacLeod; 105 pages, 1980.

No. 10 *Northern Mining in the 80s*, edited by M.J. Wojciechowski, with papers by Hon. G. Braden; R.J. Cathro; D. MacKinnon; J. Smith; R.W. Stephenson; B.E. Novak; E.N. Doyle; J.R. Witty; J.E. Marshall; A.G. Gordon; J. McCormack; H.B. Hicks; J. Zigarlick; T. Shearcroft; Dr. W. Kupsch; Dr. J. Stabler, and Hon. J. Erola; 110 pages, 1980.

No. 11 *Skilled Manpower Shortages in the 1980s: Towards a Cooperative Solution*, edited by M.J. Wojciechowski, with papers by R.J. Gray, J.S. Reid, W.H. Digby, J.B. Hopkinson, A. Knoll, O. Tremblay, G. Betcherman, P.E. Womersley, M.J. Alton, V.C. Allman, C. (P-11, $9.00)

No. 12 *Acid Rain Controls and the Economics of the Canadian Nonferrous Mineral Industry*, edited by M.J. Wojciechowski, with papers by J. Gerin, W.G. Deeks, P.R. Clarke, J.B. Hyne, H.T Fargey, B.W. Mackenzie, and E.J. Ward; 90 pages, 1982. (P-12, $9.00)

No. 13 *Mineral Policy Formulation: The Role of Scientific and Technical Knowledge*, edited by M.J. Wojciechowski, with papers by G.A. Jewett, H.D. Drechsler, P.G. Halkett, D.E. Bond, D.C. Findlay, W.G. Jeffery, L.G. Bonar, D.W. Dallas, and J. Zwartendyk; 135 pages, 1982. (P-13, $12.00)

No. 14 *Mining Communities: Hard Lessons for the Future*, edited by M.J. Wojciechowski, with papers by I. Haugh, R.P. Douglas, R. MacDonald, D. Brown, R.D. Glass and J. Lazarovich, W. Mulvihill, D. DePape, G. Paget and B. Walliser, and R. Roberts; 211 pages, 1984. (P-14, $20.00)

No. 15 *Native Participation in Mineral Development Activities*, edited by M.J. Wojciechowski; 150 pp, 1984. (P-15, $10.00)

No. 16 *Mining Productivity*, edited by M.J. Wojciechowski, with papers by K. Stollery, B.W. Mackenzie, C.G. Miller, W. James, P. LePage, W. Curlook and E. Kossatz, K. Whitham, and P.R. Richardson; 187 pages, 1984. (P-16, $15.00)

No. 17 *Canadian Mining Taxation*, edited by M.J. Wojciechowski, with papers by G. Langlois, D. Williams, T. Enemark, P. Halkett, Roberta Albert, K. Service, K. O'Brien, R. Boadway and J. Mintz; 146 pages, 1985. (P-17, $15.00)

Working Papers

*No. 1 *An Analysis of the Recent Federal Tax Changes Affecting the Canadian Mining Industry*, by Jean-Thomas Bernard; 27 pages, 6 tables, 1977.

*No. 2 *Risk and Return in the Canadian Mining Industry*, by A.M. Rugman; 31 pages, 10 tables, 1977.

*No. 3 *Provincial Mineral Policies: Newfoundland, 1949-75*, by M.J. Prince; 67 pages, 7 tables, 1977.

*No. 4 *Provincial Mineral Policies: Quebec 1945-75*, by S. Guindon; 49 pages, 1 table, 1977.

*No. 5 *Provincial Mineral Policies: Ontario 1945-75*, by R. Hynes; 48 pages, 4 tables, 1978.

*No. 6 *Provincial Mineral Policies: Saskatchewan, 1945-75*, by R.C. Murray; 64 pages, 1978.

*No. 7 *Provincial Mineral Policies: New Brunswick, Nova Scotia 1945-77*, by A. Koven; 37 pages, 1978.

No. 8 *Federal Mineral Policies: 1945-75*, by M.J. Wojciechowski; 85 pages, 21 tables, 1979. (WP-8, $5.00)

No. 9 *Trends in Canada's Mineral Trade*, by B.W. Wilkinson; 63 pages, 27 tables, 1978. (WP-9, $5.00)

No. 10 *Canada as a World Zinc Producer: Prospects to 1980*, by N.D. Olewiler, P.R. Richardson, and L. Rumble; 22 pages, 12 tables, 1978. (WP-10, $5.00)

*No. 11 *A Survey of Resources and a Production Cycle for the Non-ferrous Metals*, by C. Lafkas and J.G. Paterson; 44 pages, 9 tables, 1978.

*No. 12 *Solar Energy and the Canadian Mining Sector: A Demand Forecast*, by J.S. Shewchun and D.B. Curtis; 45 pages, 14 tables, 1978. (WP-12, $5.00)

No. 13 *Cerro Colorado: A Case Study of the Role of Canadian Crown Corporations in Foreign Mineral Development*, by C.G. Miller, N.D. Olewiler, and P.R. Richardson; 44 pages, 5 tables, 1979. (WP-13, $5.00)

No. 14 *The Administration of Mineral Exploration in the Yukon and Northwest Territories*, by K.A. Graham, R.G. McEachern and C.G. Miller; 42 pages, 1979. (WP-14, $5.00)

No. 15 *Public Policy Aspects of Information Exchange in Canadian Mineral Exploration*, by D.O.Downing and B.W. Mackenzie, 52 pages, 1979. (WP-15, $5.00)

No. 16 *Canada's Competitive Position in Copper and Zinc Markets*, by B.W. Mackenzie; 41 pages, 21 tables, 1979. (WP-16, $5.00)

No. 17 *Constitutional Change and the Mineral Industry in Canada*, by Wendy MacDonald; 66 pages, 1979. (WP-17, $5.00)

No. 18 *An Economic Analysis of the Canadian Taxation of an Integrated Mining Company*, by Jean-Thomas Bernard; 112 pages, 1980. (WP-18, $9.00)

No. 19 *Looking for the Improbable Needle in a Haystack: The Economics of Base Metal Exploration in Canada*, by B.W. Mackenzie, 48 pages, 1980. (WP-19, $5.00)

No. 20 *The Market Price of Risk in the Canadian Mining Industry*, by H.F. Campbell, 29 pages, 1980. (WP-20, $5.00)

No. 21 *Public Affairs and the Minerals Industry: Junior Mining; Northern Development; Loans for Foreign Mines; A Public Relations Strategy*, by C.G. Miller; 42 pages, 1980. (WP-21, $5.00)

No. 22 *Newfoundland Mining Industry: Present Status and Potential for Expansion*, by N.D. Olewiler and C.H. Pye; 208 pages, 83 tables, 1980. (WP-22, $14.00)

No. 23 *Effects of Water Pollution Control Costs on Base Metal Mining in Canada*, by N.A. Papanicolaou and B.W. Mackenzie; 74 pages, 1981. (WP-23, $6.00)

No. 24 *The Costs of Uncertainty: Regulating Health and Safety in the Canadian Uranium Industry*, by I. Robinson; 74 pages, 3 illustrations, 1982. (WP-24, $9.00)

No. 25 *Economic Guidelines for Small Mineral Deposits/Directives conomiques relatives aux petits gisements*, by B.W. Mackenzie and M.L. Bilodeau; 66 pages, 12 tables, 14 illustrations, 1982. (WP-25, $7.00)

No. 26 *Effects of Public Policy on Investment Demand. The Case of Taxation in Canadian Base Metal Mining*, by B.W. Mackenzie and C.H. Pye; 58 pages, 17 tables 11 illustrations, 1982. (WP-26, $7.00)

*No. 27 *The Prospects for Canadian Uranium*, by S. Salaff; 50 pages, 9 tables, 1983. (WP-27, $7.00)

No. 28 *Economic Mineral Exploration Targets*, by B.W. Mackenzie; 72 pages, 3 tables, 19 illustration, 1984. (WP-28, $7.00)

No. 29 *Dominant Government Firms in an Oligopolistic Industry: The Case of Saskatchewan Potash*, by F. Flatters and N. Olewiler; 43 pages, 3 tables, 1984. (WP-29, $5.00)

No. 30 *Canadian Mineral Policy Formulation: A Case Study of the Adversarial Process*, by David Yudelman, 83 pp, 1984. (WP-30, $6.00)

No. 31 *Federal Policy and the Role of the Public Enterprise in the Mining Sector*, by M.J. Prince and G.B. Doern, 52 pp, 1984. (WP-31, $5.00)

No. 32 *Productivity and Price: The Case of Gold in Ontario*, by A.G. Green, 54 pp, 1984. (WP-32, $5.00)

No. 33 *The Origins of Public Enterprise in the Canadian Mineral Sector: Three Provincial Case Studies*, by M.J. Prince and G.B. Doern, 143 pp, 1984. (WP-33, $14.00)

No. 34 *Mining and the Macdonald Commission: The State of the Industry in the Mid-1980s*, by D. Yudelman, 116 pages, 1985. (WP-34, $12.00)

No. 35 *Effects of Location on the Competitive Position of Mineral Exploration and Development in Canada*, by B.W. Mackenzie, D.W. Davis and M.L. Bilodeau, 88 pages, 1986. (WP-35, $8.00)

Discussion Papers

Discussion papers are a special series of short papers with limited distribution commenting on current issues in mineral resource policy. They represent the result of independent research sponsored by CRS and are offered for information and discussion, and represent an attempt to encourage feedback and further research.

Effects of the November 16, 1978 Budget on Base Metal Mining in Canada: A Challenge for the Provinces and Some Future Concerns, by Brian W. Mackenzie and Michel L. Bilodeau

Effects of Recent Mining Taxation Changes in Quebec, Ontario, and Manitoba, by Brian W. Mackenzie and Michel L. Bilodeau

Financing of Junior Mining in Canada, Summary of the Fifth CRS Policy Discussion Seminar, March 28-30, 1979

New Mining Ventures: The Case for Preserving After-Tax Financing, by William T. Cannon

The Proposed Ontario Aggregates Act: Discussion, Evaluation and Recommendations, by John Swaigen and J.F. Castrilli

Parametres Economiques de l'Exploration Minerale au Quebec: Vers la Planification et l'Elaboration d'une Politique Minerale, par M.L. Bilodeau et B.W. Mackenzie

Effects of Sulphur Dioxide Control Costs on the Canadian Base Metal Mining Sector: A Preliminary Analysis, by Brian W. Mackenzie

The Law of the Sea and Canada's Mineral Industry, by J. Owen Saunders

Technical Papers

No. 1 *Financing and Stabilization Policies in a Cyclical Industry: The Case of Inco in the Seventies*, by W.T. Cannon; 200 pages, 33 tables, 12 illustrations, 1981. (T-1, $15.00)

No. 2 *Economic Effects of Smelter Controls on the Canadian Nonferrous Mining Industry*, by B.W. Mackenzie and M.L. Bilodeau; 162 pages, 44 tables, 16 illustrations, 1982. (T-2, $15.00)

No. 3 *Secondary Supply of Copper and Ferrous Metals and Canadian Metal Markets*, by K. Stollery; 118 pages, 24 tables, 16 illustrations, 1983. (T-3, $15.00)

No. 4 *Mineral Technology Transfer: Evaluation of the CANMET Pit Slope Project*, by B.W. Mackenzie and R. Pakalnis; 220 pages, 20 tables, 17 illustrations, 1985. (T-4, $20.00)

No. 5 *Sourcebook for Native Participation in Canadian Mineral Activities*, by M.J. Wojciechowski and K.A. Graham; 165 pages, 1985. (T-5, Free)

No. 6 *Geological Aspects of Mining Productivity: Canada's Base Metal Resources*, by B.W. Mackenzie; 115 pages, 19 tables, 11 illustrations, 1985. (T-6, $10.00)

Mineral Policy Update

Mineral Policy Update 1981, by M.J. Wojciechowski and C.E. McMurray; 85 pages, 1983. (U-81, $7.00)

Mineral Policy Update 1982, by M.J. Wojciechowski and C.E. McMurray; 88 pages, 1983. (U-82, $7.00)

Mineral Policy Update 1983, by M.J. Wojciechowski; 88 pages, 1984. (U-83, $8.00)

Mineral Policy Update 1984, by M.J. Wojciechowski; 117 pages, 1985. (U-84, $12.00)

Eastern Arctic Study

The Inuit Land Claim, Constitutional Development, and Local Government Reform in the Northwest Territories: An Overview, by Katherine A. Graham and Anne B. McAllister, 50 pages, 1981. (EAS-1, $5.00)

**Industrial Development in the Eastern Arctic Study Area: A Preliminary Overview*, by C. George Miller, 31 pages, 1981. (EAS-2, $5.00)

**Eastern Arctic Study Case Study Series: The Alaska Native Claims Settlement*, by David Baker, 100 pages, 1982. (EAS-4, $5.00)

Eastern Arctic Study Case Study Series: Mineral Exploration in the Baker Lake Area, by Anne B. McAllister, 58 pages, 1982. (EAS-5, $5.00)

**Eastern Arctic Study Case Study Series: The Development of the Polaris Mine*, by Katherine A. Graham, 61 pages, 1982. (EAS-6, $5.00)

Eastern Arctic Study Case Study Series: The Nanisivik Mine, by Margot J. Wojciechowski, 62 pages, 1982. (EAS-7, $5.00)

Eastern Arctic Study Annotated Bibliography, by M.P. Sharon Brown, 68 pages, 1984. (EAS-8, $5.00)

A Climate for Change: Alternatives for the Central and Eastern Arctic, by K.A. Graham, M.P.S. Brown, A.B. McAllister, M.J. Wojciechowski, 184 pages, 1984. (EAS-9, $15.00)

**Eastern Arctic Study Case Study Series: James Bay Settlement*, by Anne B. McAllister, 61 pages, 1985. (EAS-10, $5.00)

**Eastern Arctic Study Case Study Series: Beaufort Sea Oil and Gas Development*, by M.P. Sharon Brown, Katherine A. Graham, and Margot J. Wojciechowski, 85 pages, 1985. (EAS-11, $5.00)

* Out of print CRS titles are available from:

Micromedia Limited
158 Pearl Street
Toronto, Ontario M5H 1L3